1999 Milestone Emission Inventory

As a consequence of some of the state's ozone areas remaining nonattainment at least through 2005 (Kenosha, Milwaukee, Ozaukee, Racine, Washington and Waukesha counties), a 1999 SIP milestone emission inventory (EI) has been developed for the 10 county area that illustrates the continued progress toward attainment. The ten county area is comprised of Door, Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, Sheboygan, Washington and Waukesha counties. Emissions from these ten counties are partitioned into five geographic areas: a six county area comprised of Kenosha, Milwaukee, Ozaukee, Racine, Washington and Waukesha; Door county; Kewaunee county; Manitowoc county; and Sheboygan county.

1. Organization of the Emission Inventory

To enable the ease, accuracy of calculation and analysis, an ozone precursor inventory is traditionally divided into sectors according to the nature of the source activity. Traditionally, an ozone precursor inventory is divided as follows:

Point Sources: Point sources are industrial or commercial facilities which are normally located in permanent locations, and which emit air pollutants in great enough quantities to warrant individual quantification. The 1999 point source emission inventory (EI) of the 1999 milestone EI includes as many sources as possible (i.e. every source that reported nitrogen oxides (NOx) or volatile organic compounds emissions (VOC).) to the 1999 Wisconsin point source EI) regardless of the magnitude of reported emissions with the exception of portable asphalt plants and rock crushers which are considered area sources. In the 1990 SIP EI, point sources were limited to point sources emitting more than 10 tons/year of any single criteria pollutant or 25 tons/year of any combination of criteria pollutants.

Area Sources: The area source emission inventory enables an agency to estimate emissions collectively for those sources that are too small and/or too numerous to be tracked individually in the point source inventory. The area sources includes commercial/institutional, industrial and residential sources.

Non-Road Mobile Sources: This sector of the emission inventory includes emissions from motorized equipment and other small and large engines whose primary function is not for use on public roadways.

Highway Mobile Sources: This sector of the inventory includes emissions stemming from the operation of vehicles designed primarily for highway use, such as cars, trucks, buses and road motorcycles.

2. Overview of the Emission Inventory

The 1999 milestone emission inventory (EI) is divided into five geographic areas: Door county, Kewaunee county, Manitowoc county, Sheboygan county and a six county area composed of Kenosha, Milwaukee, Ozaukee, Racine, Washington and Waukesha counties. The 1999 milestone EI contains NOx and VOC emissions only. All emissions are reported in tons of pollutant per average ozone season day with the exception of the highway mobile sector that uses a hot summer weekday. The ozone season is defined as the months of June, July and August.

This emission inventory has been created using reported point source emissions, EPA's Acid Rain Program point source emissions and approved EPA techniques for emissions calculation. Whenever feasible, federal, state and local controls are factored into the emissions calculations.

3. Calculation of the Emission Inventory

This section describes the development of the 1999 milestone emission inventory (EI) through collection, reduction and calculation of activity and emission factor data. Except for motor vehicle emissions, all category emissions are first calculated on an annual basis, then adjusted temporally to reflect average ozone season day emissions by incorporating quarterly throughputs and operating schedules. Many of the methods used are identical to those employed in the generation of the 1990 SIP EI. More detailed information concerning methodologies can be provided upon request.

3.1 Point Sources

Emissions are estimated by collecting process-level information from all facilities reported to the Wisconsin point source inventory regardless of the quantities of reported emissions. In Wisconsin, this information is normally collected via a computer diskette submittal or the Internet, and subsequently uploaded into the point source database. Emission generating processes' emissions are typically calculated using throughput information, multiplied by an emission factor for that process. Emission factor sources include mass balance, stack testing, continuous emissions monitors, engineering judgment and U.S. EPA's Factor Information Retrieval (FIRE) Data System which incorporates U.S. EPA's AP-42 documented collection of emission factors. Emissions reported to U.S. EPA's Acid Rain Program take precedence over any emissions reported to or calculated from data directly submitted to Wisconsin's point source emission inventory. Portable sources such as asphalt plants and rock crushers are treated as area sources.

3.2 Area Sources

Area source emission estimates are typically calculated using county-level estimates of population, gasoline consumption, employment or other related commercial/institutional, industrial and residential surrogates. For the appropriate categories (e.g. industrial fuel combustion), to avoid double counting, point source employment is subtracted from county level employment prior to multiplication with emission factors. Emission factors are derived from local or national surveys, or U.S. EPA procedural guidance for the development of emission inventories.

3.2.1 Area Sources Estimation Methodologies

Some 1999 area source categories use different methodologies than the 1990 SIP emission inventory (EI). When compared to the 1990 SIP EI, area source categories using different methodologies include:

- dry cleaning
- fuel combustion – residential
- gasoline storage and transport – gasoline tank trucks
- gasoline storage and transport – stage 1
- gasoline storage and transport – underground tank breathing
- gasoline storage and transport – stage 2
- municipal solid waste landfills (MSWLs)
- pesticide application
- publicly owned treatment works (POTWs)
- surface coating – automobile refinishing
- surface coating – factory finished wood
- hazardous waste treatment, storage and disposal facilities (TSDFs)

3.2.2 Area Source Controls

Area source controls are implemented for ten different area source categories. The ten controlled area source categories are commercial and consumer solvents, degreasing, gasoline storage and transport – stage 1, gasoline storage and transport – stage 2, gasoline storage and transport – underground tank breathing, municipal solid waste landfills (MSWLs), surface coating – architectural coatings, surface coating – automobile refinishing, surface coating – traffic markings and surface coating – wood furniture (see **Table 1**).

3.3 Non-Road Mobile Sources

The contribution of non-road equipment to the emission inventory was determined by a combination of equipment population, the average engine load factor, the annual hours of use, the horsepower rating, as well as the emission factor attributable to each engine. The majority of this sector was provided to states by U.S. EPA in July 1992. Equipment types provided include: lawn & garden, airport service, recreational, light commercial, industrial, construction, agricultural and logging equipment. With the exceptions of aircraft, commercial marine and locomotive categories, the non-road emission inventory from U.S. EPA's Non-Road Engines and Vehicles Emissions Study (NEVES) are grown and controlled

from the 1990 Emission Inventory using growth factors derived from projected equipment populations in the NONROAD model and control factors based the Federal non-road engine standards from the Lorang memorandum (See **Table 2**). Locomotive, aircraft, commercial and recreational marine emissions were calculated using U.S. EPA emission inventory guidance, along with activity data collected at the state level. With the exceptions of aircraft, commercial marine, locomotive and recreational marine categories, the non-road emission inventory from U.S. EPA's Non-Road Engines and Vehicles Emissions Study (NEVES) has been reapportioned to the county level using an U.S.EPA approved method developed by Energy and Environmental Analysis, Inc.. Aircraft emissions are estimated using the Federal Aviation Administration's Emissions and Dispersion Modeling System (EDMS) version 4.01. Commercial marine emissions are estimated using the same methods detailed in the 1990 SIP emission inventory. Locomotive emissions are estimated using railroad length, frequency of travel and fuel consumed.

3.4 Highway Mobile Sources

Emissions were estimated for each of the five geographic areas using vehicle-miles of travel (VMT) as the activity factor and emission factors from the U.S. EPA's MOBILE6 model.

3.4.1 Vehicle-Miles of Travel (and average speeds)

The Southeastern Wisconsin Regional Planning Commission (SEWRPC) provided the estimated 1999 summer weekday VMT for the six-county area (Kenosha, Milwaukee, Ozaukee, Racine, Washington and Waukesha Counties). SEWRPC distributed the VMT into 26 classes: 12 speed ranges for travel on standard arterials, 12 speed ranges for travel on freeways, and 2 areas (urban and rural) for travel on non-arterial roadways.

For each of the four northern counties (Door, Kewaunee, Manitowoc and Sheboygan), the 1999 summer weekday VMT was calculated from the following data provided by the Wisconsin Department of Transportation (WDOT): (1) 1999 annual average day Highway Performance Monitoring System (HPMS) VMTs, separated into the 12 HPMS functional classes, and (2) day-of-week and month-of-year adjustment factors. Also, WDOT provided to the Wisconsin Department of Natural Resources (WDNR) on September 23, 2002, updated average speeds for light-duty vehicles, light-duty trucks, and heavy-duty trucks for each of the 12 HPMS classes

3.4.2 Emission Factors

Separate MOBILE6 emission factors were calculated for each of the 26 classes for the six-county area and for each of the 12 classes for each of the four northern counties.

The allocation of VMT to the four sets of driving cycles in MOBILE6 was consistent with U.S. EPA technical guidance (Technical Guidance on the Use of MOBILE6 for Emission Inventory Preparation, January, 2002), and was done as follows:

> *Freeway Driving Cycles:* The roadways assumed to be subject to the MOBILE6 "freeway driving cycles" were: (1) those classified as "Freeway" for the six-county area and (2) those belonging to the following four HPMS functional classes for the four northern counties: "Rural - Interstate", "Rural - Other Principal Arterial", "Urban - Interstate", and "Urban - Other Freeway and Expressway". As suggested in the U.S. EPA technical guidance, 92% of the VMT on these roadways was modeled at the "freeway driving cycles".
>
> *Freeway Ramp Driving Cycle:* As suggested in the U.S. EPA technical guidance, 8% of the VMT on roadways subject to the MOBILE6 "freeway driving cycles" was modeled at the MOBILE6 "freeway ramp driving cycle" at the average speed assumed by MOBILE6 (34.6 mph). For the six-county area, the "freeway ramp" VMT was selected from the speed ranges in such a way that the average speed of that VMT was 34.6 mph. For the four northern counties, the average speed for the non-ramp activity VMT on the "Rural - Other Principal Arterial" class was adjusted to account for the speed of 34.6 mph for the 8% of the VMT modeled at the "freeway ramp driving cycle". No other speed adjustments for the four northern counties were deemed necessary, based on discussions with WDOT.

Local Roadway Driving Cycle: The roadways assumed to be subject to the "local roadway driving cycle" were "Non-Arterial - Urban" roadways for the six-county area and the roadways belonging to the "Urban - Local" HPMS functional class for the four northern counties. All of the VMT on these roadways was modeled at the "local roadway driving cycle". MOBILE6 assumes that the average speed for this driving cycle is 12.9 mph.

Arterial/Collector Driving Cycles: All of the VMT on the remaining facilities ("Standard Arterial" for the six-county area and the remaining seven HPMS functional classes for the four northern counties) was modeled at the MOBILE6 "arterial/collector driving cycles".

WDNR converted local distributions of VMT by the eight MOBILE5 vehicle types to the 16 combined MOBILE6 vehicle types, following the procedures in the above-cited U.S. EPA technical guidance for MOBILE6. The local eight-vehicle-type distributions were based on: (1) those provided in SEWRPC's Memorandum Report Number 125 (conformity assessment document), December, 1997, page 25b, and (2) estimated 1999 vehicle type distributions provided by WDOT on September 3, 2002. WDNR adjusted the distributions in the SEWRPC report to 1999 based on data from WDOT's annual Vehicle Classification Data reports. For all the distributions, the proportional split between cars and light trucks was estimated based on data from Wisconsin's inspection and maintenance (I/M) program (total vehicles tested by vehicle type and model year).

Local distributions of registrations by vehicle age were used for the light-duty vehicle types (LDGV, LDGT1 and LDGT2 in MOBILE5 terminology). These distributions were estimated from Wisconsin I/M program data (total vehicles tested by vehicle type and model year). For the heavy-duty vehicle types and motorcycles, the MOBILE6 default registration distributions were used.

An enhanced I/M program was modeled for the six-county area and Sheboygan County. Only HC and CO cutpoints were modeled, since the program did not start pass/fail testing for NOx until May of 2001. Phase 1 reformulated gasoline was modeled for the six-county area. Conventional gasoline with a Reid Vapor Pressure (RVP) of 8.8 psi was modeled for the other four counties, with a one psi RVP waiver modeled for alcohol blends. (4.2% of the gasoline market share was assumed to be alcohol blends, based on data from the Wisconsin Energy Bureau, Department of Administration).

Local meteorological inputs (daily minimum and maximum temperatures and absolute humidity) were based on the 10 highest ozone days during the three year period of 1988-1990; and were calculated in accordance with the procedures in the above-cited U.S. EPA technical guidance for MOBILE6.

Detailed data for the highway mobile sector modeling are provided in **Appendix 4-3**. (Electronic or paper copies of this appendix can be obtained from Christopher Bovee, Wisconsin Department of Natural Resources, phone: 608/266-5542, e-mail: christopher.bovee@dnr.state.wi.us)

4. Emissions Summaries

Point source group definitions and emissions are summarized in **Tables 3 and 4** respectively. Area source NOx emissions are summarized in **Table 5**. Area source VOC emissions are summarized in **Table 6**. Non-road emissions are summarized in **Table 7**. All emissions are summarized by geographic area and source sector in **Table 8**.

5. References

1. Methodology to Calculate Nonroad Emission Inventories at the County and Sub-County Level: Final report, Energy and Environmental Analysis, Inc., Arlington, VA, July 1992 (Prepared for U.S. EPA).

Table 1: 1999 Area Source Controls: Control Efficiency (CE), Rule Effectiveness (RE), Rule Penetration (RP) and Emission Reduction Summary

Category	SCC	CE	RE	RP	Emission reduction	Comments
Commercial and consumer solvents	2460000000				20%	Federal rule applies statewide, 9% VOC ROP Plan references a 3/22/95 guidance memorandum issued by OAQPS that specifies a 20% reduction.
Degreasing	2415000000				30%	From approved 9% Plan for Kewaunee, Manitowoc, Sheboygan, Washington, Ozaukee, Waukesha, Milwaukee, Racine and Kenosha counties.
Gasoline storage and transport - stage 1	2501060050	97.39%	80%	100%		Cntl. eff. calculated using vapor balance filling ef and the splash underground tank ef in Preferred and Alternative Methods for Estimating Air Emissions form Area Sources, Volume III, Chapter 11, Gasoline Marketing (Stage I and Stage II), January 2001.
Gasoline storage and transport - stage 2	2501060100					All three components are combined into emission factors.
Gasoline storage and transport - underground tank breathing	2501060201	100%	80%	95%		CE, RE and RP are from the 15% plan.
Municipal solid waste landfills	2620030000	If flares are used, 98%				Capture and control efficiencies at facility level. If flares are used, capture efficiency is 75%.
Surface coating - architectural coatings	2401001000				20%	Federal rule applies statewide. 9% VOC ROP Plan references OAR policy and guidance memorandum
Surface coating - automobile refinishing	2401005000	67.4%	100%	98%		From approved 9% Plan for Kewaunee, Manitowoc, Sheboygan, Washington, Ozaukee, Waukesha, Milwaukee, Racine and Kenosha counties.
Surface coating - traffic markings	2401008000	75.9%	100%	100%		9 - county AIM control (NR 422.17). Extended to Door county by contract.
Surface coating - wood furniture	2401020000	20.0%	100%	100%		From approved 9% Plan for Kewaunee, Manitowoc, Sheboygan, Washington, Ozaukee, Waukesha, Milwaukee, Racine and Kenosha counties.

Table 2: 1999 Non-Road Growth Factors based on the NONROAD model

Non-road group	SCC	1999 GF
2-Stroke Recreational Vehicles	2260001000	1.0738229
2-Stroke Construction Equipment	2260002000	1.0246531
2-Stroke Industrial Equipment	2260003000	0.7112883
2-Stroke Lawn & Garden Equipment	2260004000	1.2515957
2-Stroke Farm Equipment	2260005000	1.1844674
2-Stroke Light Commercial	2260006000	1.4781692
2-Stroke Logging Equipment	2260007000	1.6163168
2-Stroke Airport Service Equipment	2260008000	1.1194933
2-Stroke Underground Mining Equipment	2260009000	1.2475858
4-Stroke Recreational Vehicles	2265001000	1.0738229
4-Stroke Construction Equipment	2265002000	1.0246531
4-Stroke Industrial Equipment	2265003000	0.7112883
4-Stroke Lawn & Garden Equipment	2265004000	1.2515957
4-Stroke Farm Equipment	2265005000	1.1844674
4-Stroke Light Commercial	2265006000	1.4781692
4-Stroke Logging Equipment	2265007000	1.6163168
4-Stroke Airport Service Equipment	2265008000	1.1194933
4-Stroke Underground Mining Equipment	2265009000	1.2475858
Diesel Recreational Vehicles	2270001000	1.3840722
Diesel Construction Equipment	2270002000	1.3580211
Diesel Industrial Equipment	2270003000	1.3927244
Diesel Lawn & Garden Equipment Lawn mowers	2270004000	2.1033936
Diesel Farm Equipment	2270005000	1.3112378
Diesel Light Commercial	2270006000	1.5662491
Diesel Logging Equipment	2270007000	0.9277121
Diesel Airport Service Equipment	2270008000	2.0578446
Diesel Underground Mining Equipment	2270009000	1.2475858
2-Stroke Recreational Marine	2282005000	1.0738229
4-Stroke Recreational Marine	2282010000	1.0738229
Diesel Recreational Marine	2282020000	1.3840722

Table 3: Point Source Group Definitions

Point source groups	Source Classification Codes
Boilers/Engines	10100101- 28888803
Chemical manufacturing	30100101 - 30199999, not 30190001 - 99 (see "In process fuel").
Food and agriculture	30200101 - 30299999, not 30290001 - 30291001(see "In process fuel").
Primary metals	30300001 - 30399999, not 30390001 - 24 (see "In process fuel").
Secondary metals	30400101 - 30499999, not 30400406 – 7 and 30490001 - 35 (see "In process fuel").
Mineral products	30500101 - 30599999, not 30500206 - 10, 30505020 – 3 and 30590001 - 23 (see "In process fuel").
In process fuel	39000189 - 39092056, 30190001 - 99, 30290001 - 30291001, 30390001 - 24, 30400406 - 7, 30490001 - 35, 30500206 - 10, 30505020 - 3, 30590001 - 23, 30600101 - 11, 30600901 - 5, 30609901 - 5, 30790001 - 23, 30890001 - 23, 30990001 - 23, 31000401 - 14, 31390001 - 3, 39900501 - 601, 39901001 - 39990023, 40201001 - 4, 40290011 - 23, 49090011 - 3, 49090021 - 3, 50190002 - 10, 50290002 - 10, 50390002 - 6 and 50390010
Organic solvents	30800108 - 10, 30800703, 31303502, 31401560 - 3, 31502001 - 3, 31612001 – 31613001, 33000297, 40100101 - 40188898, 40700401 - 49099999
Surface coating	40200101 - 40299999, not 40201001 – 4 and 40290011 - 23 (see "In process fuel").
Petroleum storage	40300101 - 40400498
Printing/publishing	40500101 - 40588805
Solid waste disposal	50100101 - 50390010
Other	All remaining SCCs between 10100101 and 68582599 inclusive.
Not classified	SCCs < 10100101 or > 68582599

Table 4: 1999 NOx and VOC Point Source Emissions

	Door county		Kewaunee county		Manitowoc county		Sheboygan county		Six Counties		Totals	
Group	**NOx**	**VOC**	**NOx**	**VOC**	**NOx**	**VOC**	**NOx**	**VOC**	**NOx**	**VOC**	**NOx**	**VOC**
Boilers / Engines	0.001	0.000	0.027	0.002	2.686	0.041	47.245	0.267	116.709	1.205	166.668	1.515
Chemical Mfg	0.000	0.000	0.000	0.000	0.000	0.011	0.006	0.022	0.000	2.143	0.006	2.176
Food & Ag	0.000	0.000	0.000	0.000	0.004	0.112	0.000	0.000	0.041	1.280	0.045	1.392
In Process Fuel	0.006	0.000	0.007	0.000	0.171	0.006	0.376	0.015	2.139	0.184	2.699	0.205
Mineral Products	0.006	0.000	0.005	0.004	0.479	0.011	0.018	0.016	1.210	0.204	1.718	0.235
Not Classified	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Organic Solvents	0.000	0.000	0.000	0.013	0.000	0.337	0.000	0.074	0.000	1.223	0.000	1.647
Other	0.000	0.000	0.000	0.012	0.023	0.120	0.000	0.282	0.103	1.349	0.126	1.763
Petroleum Storage	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.296	0.000	0.296
Primary Metals	0.000	0.000	0.000	0.000	0.001	0.058	0.000	0.000	0.004	0.091	0.005	0.149
Printing / Publishing	0.000	0.000	0.000	0.095	0.000	0.033	0.000	0.097	0.008	2.104	0.008	2.329
Secondary Metals	0.002	0.004	0.000	0.000	0.019	0.201	0.000	0.464	0.594	1.748	0.615	2.417
Solid Waste Disposal	0.000	0.000	0.000	0.000	0.007	0.002	0.000	0.000	0.039	0.075	0.046	0.077
Surface Coating	0.000	0.139	0.000	0.461	0.000	0.992	0.000	1.686	0.006	7.921	0.006	11.199
Totals	0.02	0.14	0.04	0.59	3.39	1.92	47.65	2.92	120.85	19.82	171.94	25.40

Table 5: 1999 Area Source NOx Emissions (tons per ozone season day)

SCC	SCC description	Door county	Kewaunee county	Manitowoc county	Sheboygan county	Six counties	Totals
2102002000	Fuel combustion - industrial - bituminous/subbituminous coal	0.065	0.065	0.392	0.813	6.541	7.876
2102004000	Fuel combustion - industrial - distillate oil	0.009	0.009	0.053	0.111	0.853	1.036
2102005000	Fuel combustion - industrial - residual oil	0.000	0.000	0.000	0.000	0.000	0.000
2102006000	Fuel combustion - industrial - natural gas	0.051	0.023	0.170	0.464	4.350	5.058
2102007000	Fuel combustion - industrial - LPG	0.003	0.003	0.016	0.031	0.260	0.313
2102008000	Fuel combustion - industrial - wood	0.002	0.002	0.012	0.024	0.201	0.241
2102011000	Fuel combustion - industrial - kerosene	0.000	0.000	0.000	0.000	0.003	0.003
2103002000	Fuel combustion - commercial/institutional - coal	0.000	0.000	0.000	0.000	0.000	0.000
2103004000	Fuel combustion - commercial/institutional - distillate oil	0.005	0.002	0.010	0.016	0.357	0.391
2103005000	Fuel combustion - commercial/institutional - residual oil	0.001	0.000	0.001	0.002	0.039	0.043
2103006000	Fuel combustion - commercial/institutional - natural gas	0.106	0.038	0.216	0.341	7.442	8.143
2103007000	Fuel combustion - commercial/institutional - LPG	0.003	0.001	0.006	0.010	0.231	0.252
2103008000	Fuel combustion - commercial/institutional - wood	0.000	0.000	0.000	0.000	0.000	0.000
2103011000	Fuel combustion - commercial/institutional - kerosene	0.000	0.000	0.000	0.000	0.002	0.002
2104001000	Fuel combustion - residential - anthracite coal	0.000	0.000	0.000	0.000	0.008	0.009
2104004000	Fuel combustion - residential - distillate oil	0.005	0.003	0.014	0.019	0.318	0.361
2104006000	Fuel combustion - residential - natural gas	0.025	0.018	0.076	0.103	1.680	1.903
2104007000	Fuel combustion - residential - LPG	0.006	0.004	0.018	0.024	0.392	0.444
2104008000	Fuel combustion - residential - wood	0.003	0.002	0.004	0.003	0.012	0.023
2104011000	Fuel combustion - residential - kerosene	0.000	0.000	0.000	0.000	0.007	0.008
2305000000	Rock crushers	0.000	0.000	0.000	0.000	0.000	0.000
2306010000	Asphalt plants	0.000	0.000	0.000	0.000	0.000	0.000
2601000000	On-site incineration	0.000	0.000	0.000	0.000	0.000	0.000
2610000100	Open burning - yard waste - leaf species unspecified	0.001	0.001	0.001	0.001	0.004	0.007
2610000400	Open burning - yard waste - brush species unspecified	0.001	0.001	0.001	0.001	0.004	0.007
2610000500	Open burning - land clearing	0.026	0.001	0.003	0.006	0.067	0.102
2610030000	Open burning - residential MSW	0.037	0.028	0.069	0.080	0.291	0.506
2620030000	MSWLs	0.000	0.000	0.000	0.000	0.447	0.448
2810001000	Forest fires	0.000	0.000	0.000	0.000	0.000	0.000
2810030000	Structure fires	0.000	0.000	0.000	0.000	0.006	0.007
	Totals	0.35	0.20	1.06	2.05	23.52	27.18

Table 6: Area Source VOC Emissions (tons per ozone season day)

SCC	SCC description	Door county	Kewaunee county	Manitowoc county	Sheboygan county	Six counties	Totals
2102002000	Fuel combustion - industrial - bituminous/subbituminous coal	0.000	0.000	0.001	0.002	0.014	0.017
2102004000	Fuel combustion - industrial - distillate oil	0.000	0.000	0.001	0.001	0.009	0.010
2102005000	Fuel combustion - industrial - residual oil	0.000	0.000	0.000	0.000	0.000	0.000
2102006000	Fuel combustion - industrial - natural gas	0.001	0.000	0.003	0.009	0.085	0.099
2102007000	Fuel combustion - industrial - LPG	0.000	0.000	0.000	0.000	0.003	0.004
2102008000	Fuel combustion - industrial - wood	0.000	0.000	0.002	0.004	0.029	0.035
2102011000	Fuel combustion - industrial - kerosene	0.000	0.000	0.000	0.000	0.000	0.000
2103002000	Fuel combustion - commercial/institutional - coal	0.000	0.000	0.000	0.000	0.000	0.000
2103004000	Fuel combustion - commercial/institutional - distillate oil	0.000	0.000	0.000	0.000	0.006	0.007
2103005000	Fuel combustion - commercial/institutional - residual oil	0.000	0.000	0.000	0.000	0.001	0.001
2103006000	Fuel combustion - commercial/institutional - natural gas	0.002	0.001	0.004	0.007	0.146	0.160
2103007000	Fuel combustion - commercial/institutional - LPG	0.000	0.000	0.000	0.000	0.008	0.008
2103008000	Fuel combustion - commercial/institutional - wood	0.000	0.000	0.000	0.000	0.000	0.000
2103011000	Fuel combustion - commercial/institutional - kerosene	0.000	0.000	0.000	0.000	0.000	0.000
2104001000	Fuel combustion - residential - anthracite coal	0.000	0.000	0.000	0.000	0.000	0.000
2104004000	Fuel combustion - residential - distillate oil	0.000	0.000	0.001	0.001	0.013	0.014
2104006000	Fuel combustion - residential - natural gas	0.001	0.001	0.004	0.006	0.098	0.111
2104007000	Fuel combustion - residential - LPG	0.000	0.000	0.001	0.001	0.013	0.015
2104008000	Fuel combustion - residential - wood	0.270	0.137	0.338	0.257	1.044	2.045
2104011000	Fuel combustion - residential - kerosene	0.000	0.000	0.000	0.000	0.000	0.000
2275900000	Aircraft refueling	0.003	0.000	0.000	0.004	0.032	0.038
2302050000	Bakeries	0.013	0.010	0.040	0.054	0.808	0.924
2305000000	Rock crushers	0.000	0.000	0.000	0.000	0.000	0.000
2306010000	Asphalt plants	0.000	0.000	0.000	0.000	0.000	0.000
2401001000	Surface coating - architectural coatings	0.138	0.100	0.413	0.558	9.131	10.341
2401005000	Surface coating - automobile refinishing	0.034	0.012	0.150	0.154	4.307	4.657
2401008000	Surface coating - traffic markings	0.017	0.013	0.052	0.070	1.148	1.300
2401015000	Surface coating - factory finished wood	0.000	0.056	0.021	0.031	0.127	0.235
2401020000	Surface coating - wood furniture	0.000	0.000	0.085	0.168	0.181	0.434
2401025000	Surface coating - metal furniture	0.000	0.000	0.003	0.005	0.006	0.013
2401040000	Surface coating - metal cans	0.014	0.010	0.134	0.144	1.136	1.440
2401050000	Surface coating - misc. finished metals	0.064	0.046	0.594	0.641	5.043	6.389
2401055000	Surface coating - machinery and equipment	0.043	0.028	0.256	0.282	3.933	4.543
2401060000	Surface coating - large appliances	0.015	0.000	0.015	0.015	0.411	0.455
2401065000	Surface coating - electronic and other electrical	0.115	0.000	0.117	0.115	2.929	3.276
2401080000	Surface coating - marine	0.267	0.000	0.006	0.013	0.321	0.607
2401085000	Surface coating - railroad	0.000	0.000	0.001	0.002	0.057	0.060
2401090000	Surface coating - misc. manufacturing coatings	0.032	0.023	0.095	0.129	2.110	2.390
2401100000	Surface coating - industrial maintenance coatings	0.034	0.025	0.102	0.138	2.251	2.549
2401200000	Surface coating - special purpose coatings	0.034	0.025	0.102	0.138	2.251	2.549
2415000000	Degreasing	0.245	0.077	0.764	0.983	16.969	19.037
2420000000	Dry cleaning	0.031	0.000	0.000	0.184	6.421	6.636
2425000000	Graphic arts solvents	0.024	0.018	0.073	0.098	1.607	1.820
2460000000	Commercial and consumer solvents	0.238	0.172	0.710	0.960	15.712	17.793
2461050000	Asphalt paving	0.280	0.018	0.347	0.465	1.732	2.842
2461850000	Pesticide application	0.152	0.225	0.426	0.377	1.495	2.675

Table 6: Area Source VOC Emissions (tons per ozone season day) (cont.)

SCC	SCC description	Door county	Kewaunee county	Manitowoc county	Sheboygan county	Six counties	Totals
2501060050	Gasoline storage and transport - stage 1	0.065	0.041	0.170	0.215	3.173	3.663
2501060100	Gasoline storage and transport - stage 2	0.170	0.031	0.131	0.166	2.242	2.740
2501060201	Gasoline storage and transport - underground tank breathing	0.011	0.007	0.030	0.037	0.553	0.639
2505030120	Gasoline storage and transport - tank trucks	0.002	0.001	0.005	0.006	0.094	0.108
2601000000	On-site incineration	0.000	0.000	0.000	0.000	0.000	0.000
2610000100	Open burning - yard waste - leaf species unspecified	0.005	0.004	0.005	0.005	0.031	0.050
2610000400	Open burning - yard waste - brush species unspecified	0.003	0.003	0.003	0.004	0.021	0.034
2610000500	Open burning - land clearing	0.059	0.002	0.007	0.013	0.154	0.235
2610030000	Open burning - residential MSW	0.185	0.141	0.344	0.402	1.457	2.528
2620030000	MSWLs	0.003	0.002	0.001	0.002	0.048	0.055
2630010000	IWTFs	0.000	0.000	0.000	0.013	0.673	0.686
2630020000	POTWs	0.023	0.017	0.697	0.033	3.643	4.414
2640000000	TSDFs	0.000	0.000	0.000	0.000	0.115	0.115
2810001000	Forest wildfires	0.000	0.000	0.000	0.000	0.000	0.000
2810030000	Structure fires	0.001	0.001	0.002	0.003	0.048	0.055
	Totals	2.60	1.24	6.25	6.92	93.84	110.85

Table 7: 1999 Non-Road Emissions (tons per ozone season day)

County	SCC	SCC description	NOx	VOC
Door	2275000000	Aircraft	0.006	0.010
Door	2280000000	Commercial Marine	0.000	0.000
Door	2282000000	Recreational Marine	0.282	3.915
Door	2285002000	Locomotives	0.000	0.000
Door	2260001000	Recreational Equipment	0.000	0.011
Door	2260002000	Construction and Mining Equipment	0.000	0.002
Door	2260003000	Industrial Equipment	0.015	0.007
Door	2260004000	Lawn and Garden Equipment	0.000	0.135
Door	2260005000	Agricultural Equipment	0.000	0.000
Door	2260006000	Commercial Equipment	0.000	0.017
Door	2260007000	Logging Equipment	0.000	0.002
Door	2260008000	Airport Ground Support Equipment	0.000	0.000
Door	2265001000	Recreational Equipment	0.000	0.007
Door	2265002000	Construction and Mining Equipment	0.000	0.003
Door	2265003000	Industrial Equipment	0.005	0.013
Door	2265004000	Lawn and Garden Equipment	0.004	0.139
Door	2265005000	Agricultural Equipment	0.000	0.005
Door	2265006000	Commercial Equipment	0.001	0.030
Door	2265007000	Logging Equipment	0.000	0.000
Door	2265008000	Airport Ground Support Equipment	0.001	0.003
Door	2270001000	Recreational Equipment	0.000	0.000
Door	2270002000	Construction and Mining Equipment	0.327	0.043
Door	2270003000	Industrial Equipment	0.057	0.007
Door	2270004000	Lawn and Garden Equipment	0.003	0.000
Door	2270005000	Agricultural Equipment	0.223	0.048
Door	2270006000	Commercial Equipment	0.007	0.001
Door	2270007000	Logging Equipment	0.000	0.000
Door	2270008000	Airport Ground Support Equipment	0.084	0.011
Kewaunee	2275000000	Aircraft	0.000	0.000
Kewaunee	2280000000	Commercial Marine	0.000	0.000
Kewaunee	2282000000	Recreational Marine	0.028	0.440
Kewaunee	2285002000	Locomotives	0.018	0.001
Kewaunee	2260001000	Recreational Equipment	0.000	0.008
Kewaunee	2260002000	Construction and Mining Equipment	0.000	0.002
Kewaunee	2260003000	Industrial Equipment	0.011	0.005
Kewaunee	2260004000	Lawn and Garden Equipment	0.000	0.100
Kewaunee	2260005000	Agricultural Equipment	0.000	0.000
Kewaunee	2260006000	Commercial Equipment	0.000	0.013
Kewaunee	2260007000	Logging Equipment	0.000	0.002
Kewaunee	2260008000	Airport Ground Support Equipment	0.000	0.000
Kewaunee	2265001000	Recreational Equipment	0.000	0.005
Kewaunee	2265002000	Construction and Mining Equipment	0.000	0.002
Kewaunee	2265003000	Industrial Equipment	0.003	0.009
Kewaunee	2265004000	Lawn and Garden Equipment	0.003	0.102
Kewaunee	2265005000	Agricultural Equipment	0.000	0.004
Kewaunee	2265006000	Commercial Equipment	0.001	0.022
Kewaunee	2265007000	Logging Equipment	0.000	0.000
Kewaunee	2265008000	Airport Ground Support Equipment	0.001	0.002
Kewaunee	2270001000	Recreational Equipment	0.000	0.000
Kewaunee	2270002000	Construction and Mining Equipment	0.241	0.031
Kewaunee	2270003000	Industrial Equipment	0.042	0.005
Kewaunee	2270004000	Lawn and Garden Equipment	0.002	0.000
Kewaunee	2270005000	Agricultural Equipment	0.164	0.035
Kewaunee	2270006000	Commercial Equipment	0.005	0.000
Kewaunee	2270007000	Logging Equipment	0.000	0.000

Table 7: 1999 Non-Road Emissions (tons per ozone season day) (cont.)

County	SCC	SCC description	NOx	VOC
Kewaunee	2270008000	Airport Ground Support Equipment	0.062	0.008
Manitowoc	2275000000	Aircraft	0.000	0.000
Manitowoc	2280000000	Commercial Marine	0.000	0.046
Manitowoc	2282000000	Recreational Marine	0.058	0.823
Manitowoc	2285002000	Locomotives	0.089	0.003
Manitowoc	2260001000	Recreational Equipment	0.000	0.035
Manitowoc	2260002000	Construction and Mining Equipment	0.000	0.007
Manitowoc	2260003000	Industrial Equipment	0.047	0.022
Manitowoc	2260004000	Lawn and Garden Equipment	0.000	0.424
Manitowoc	2260005000	Agricultural Equipment	0.000	0.000
Manitowoc	2260006000	Commercial Equipment	0.000	0.054
Manitowoc	2260007000	Logging Equipment	0.000	0.008
Manitowoc	2260008000	Airport Ground Support Equipment	0.000	0.000
Manitowoc	2265001000	Recreational Equipment	0.000	0.021
Manitowoc	2265002000	Construction and Mining Equipment	0.000	0.010
Manitowoc	2265003000	Industrial Equipment	0.015	0.040
Manitowoc	2265004000	Lawn and Garden Equipment	0.013	0.436
Manitowoc	2265005000	Agricultural Equipment	0.000	0.015
Manitowoc	2265006000	Commercial Equipment	0.003	0.095
Manitowoc	2265007000	Logging Equipment	0.000	0.000
Manitowoc	2265008000	Airport Ground Support Equipment	0.003	0.008
Manitowoc	2270001000	Recreational Equipment	0.000	0.000
Manitowoc	2270002000	Construction and Mining Equipment	1.025	0.134
Manitowoc	2270003000	Industrial Equipment	0.179	0.022
Manitowoc	2270004000	Lawn and Garden Equipment	0.011	0.000
Manitowoc	2270005000	Agricultural Equipment	0.698	0.150
Manitowoc	2270006000	Commercial Equipment	0.021	0.002
Manitowoc	2270007000	Logging Equipment	0.000	0.000
Manitowoc	2270008000	Airport Ground Support Equipment	0.263	0.033
Sheboygan	2275000000	Aircraft	0.008	0.014
Sheboygan	2280000000	Commercial Marine	0.000	0.000
Sheboygan	2282000000	Recreational Marine	0.040	0.785
Sheboygan	2285002000	Locomotives	0.375	0.015
Sheboygan	2260001000	Recreational Equipment	0.000	0.074
Sheboygan	2260002000	Construction and Mining Equipment	0.000	0.008
Sheboygan	2260003000	Industrial Equipment	0.057	0.027
Sheboygan	2260004000	Lawn and Garden Equipment	0.000	0.560
Sheboygan	2260005000	Agricultural Equipment	0.000	0.000
Sheboygan	2260006000	Commercial Equipment	0.000	0.011
Sheboygan	2260007000	Logging Equipment	0.000	0.025
Sheboygan	2260008000	Airport Ground Support Equipment	0.000	0.000
Sheboygan	2265001000	Recreational Equipment	0.000	0.049
Sheboygan	2265002000	Construction and Mining Equipment	0.000	0.000
Sheboygan	2265003000	Industrial Equipment	0.014	0.050
Sheboygan	2265004000	Lawn and Garden Equipment	0.000	0.382
Sheboygan	2265005000	Agricultural Equipment	0.000	0.115
Sheboygan	2265006000	Commercial Equipment	0.000	0.080
Sheboygan	2265007000	Logging Equipment	0.000	0.000
Sheboygan	2265008000	Airport Ground Support Equipment	0.000	0.000
Sheboygan	2270001000	Recreational Equipment	0.000	0.000
Sheboygan	2270002000	Construction and Mining Equipment	1.317	0.163
Sheboygan	2270003000	Industrial Equipment	0.347	0.042
Sheboygan	2270004000	Lawn and Garden Equipment	0.021	0.000
Sheboygan	2270005000	Agricultural Equipment	4.050	0.879
Sheboygan	2270006000	Commercial Equipment	0.016	0.000

Table 7: Non-Road Emissions (tons per ozone season day) (cont.)

County	SCC	SCC description	NOx	VOC
Sheboygan	2270007000	Logging Equipment	0.000	0.000
Sheboygan	2270008000	Airport Ground Support Equipment	0.000	0.000
Six counties	2275000000	Aircraft	1.035	0.202
Six counties	2280000000	Commercial Marine	0.010	0.062
Six counties	2282000000	Recreational Marine	0.424	7.257
Six counties	2285002000	Locomotives	4.360	0.170
Six counties	2260001000	Recreational Equipment	0.000	0.724
Six counties	2260002000	Construction and Mining Equipment	0.000	0.158
Six counties	2260003000	Industrial Equipment	1.024	0.471
Six counties	2260004000	Lawn and Garden Equipment	0.000	9.138
Six counties	2260005000	Agricultural Equipment	0.000	0.000
Six counties	2260006000	Commercial Equipment	0.000	1.219
Six counties	2260007000	Logging Equipment	0.000	0.150
Six counties	2260008000	Airport Ground Support Equipment	0.000	0.000
Six counties	2265001000	Recreational Equipment	0.000	0.436
Six counties	2265002000	Construction and Mining Equipment	0.000	0.235
Six counties	2265003000	Industrial Equipment	0.326	0.875
Six counties	2265004000	Lawn and Garden Equipment	0.305	9.598
Six counties	2265005000	Agricultural Equipment	0.000	0.239
Six counties	2265006000	Commercial Equipment	0.080	2.097
Six counties	2265007000	Logging Equipment	0.000	0.000
Six counties	2265008000	Airport Ground Support Equipment	0.078	0.179
Six counties	2270001000	Recreational Equipment	0.000	0.000
Six counties	2270002000	Construction and Mining Equipment	22.121	2.893
Six counties	2270003000	Industrial Equipment	3.749	0.460
Six counties	2270004000	Lawn and Garden Equipment	0.222	0.000
Six counties	2270005000	Agricultural Equipment	11.920	2.557
Six counties	2270006000	Commercial Equipment	0.454	0.047
Six counties	2270007000	Logging Equipment	0.000	0.000
Six counties	2270008000	Airport Ground Support Equipment	6.015	0.761
		Totals	62.39	50.80

Table 8: 1999 Emissions Summary by Geographic Area and Source Sector

Geographic area	NOx					VOC				
	Point	Area	Non-Road	Mobile	Totals	Point	Area	Non-Road	Mobile	Totals
Six Counties	120.9	23.5	52.2	110.0	306.5	19.8	93.8	39.9	56.4	209.9
Sheboygan County	47.6	2.1	6.2	8.7	64.6	2.9	6.9	3.3	4.7	17.9
Manitowoc County	3.4	1.1	2.5	7.9	14.9	1.9	6.3	2.3	4.4	14.9
Kewaunee County	0.0	0.2	0.6	1.3	2.1	0.6	1.2	0.8	0.9	3.5
Door County	0.0	0.3	1.0	2.7	4.1	0.1	2.6	4.4	1.7	8.9
Totals	171.9	27.2	62.5	130.6	392.2	25.4	110.8	50.7	68.1	255.1